

Applicant : Zihong Jin et al.
Serial No. : 09/787,858
Filed : March 22, 2001
For : Performance Enhancing Additives for Electrochemical Cells

Art Unit: 1745
Examiner: Tracy Mae Dove

CLAIM AMENDMENTS

1. (currently amended) An alkaline electrochemical battery cell comprising an anode, a cathode, a separator between the anode and cathode, and an electrolyte, wherein at least one of the anode, cathode and electrolyte contains an n-type metal oxide particles as an additive.
2. (original) The cell according to claim 1, wherein the electrolyte is an aqueous electrolyte.
3. (original) The cell according to claim 1, wherein the n-type metal oxide additive is a doped metal oxide, comprising a metal oxide modified by incorporation of a dopant.
4. (original) The cell according to claim 1, wherein the n-type metal oxide additive is a reduced metal oxide.
5. (original) The cell according to claim 3, wherein the metal oxide is selected from the group consisting of BaTiO₃, K₂TiO₃, CoTiO₃, SrTiO₃, CaTiO₃, MgTiO₃, SiO₂, CaO, TiO₂, CoO, Co₃O₄, ZnO, SnO, SnO₂, PbO₂, Bi₂O₃, Bi₂O₃•3ZrO₃, Bi₁₂TiO₂₀, Fe₂O₃-TiO₂, Nb₂O₅, CaWO₄, ZnMn₂O₄, and K₂Cr₂O₇.
6. (original) The cell according to claim 3, wherein the metal oxide is selected from the group consisting of SiO₂, TiO₂ and SnO₂.
7. (original) The cell according to claim 3, wherein the dopant comprises a cation that, when added to the structure of the undoped metal oxide, reduced the resistivity of the metal oxide.
8. (original) The cell according to claim 7, wherein the metal oxide is TiO₂ and the dopant is selected from the group consisting of NbO₂, Nb₂O₅, Ta₂O₅, WO₃, GeO₂, ZrO₂, SnO₂, ThO₂, Fe₂O₃, In₂O₃, LiNiO₂ and P₂O₅.
9. (original) The cell according to claim 8, wherein the dopant is Nb₂O₅.

Applicant : Zihong Jin et al.
Serial No. : 09/787,858
Filed : March 22, 2001
For : Performance Enhancing Additives for Electrochemical Cells

Art Unit: 1745
Examiner: Tracy Mae Dove

10. (original) The cell according to claim 6, wherein the metal oxide is SnO_2 and the dopant is selected from the group consisting of In_2O_3 , Sb_2O_5 , Nb_2O_5 , WO_3 and P_2O_5 .
11. (original) The cell according to claim 1, wherein the metal oxide additive is initially contained in the cathode.
12. (original) The cell according to claim 2, wherein the anode comprises zinc and the cathode comprises MnO_2 .
13. (original) The cell according to claim 12, wherein the metal oxide is TiO_2 and the dopant is Nb_2O_5 .
14. (currently amended) The cell according to claim 13, wherein the n-type metal oxide has an average particle size of ~~about 60 microns~~ μm or less.
15. (currently amended) The cell according to claim 14, wherein the average particle size is ~~15 microns~~ μm or less.
16. (currently amended) The cell according to claim 15, wherein the average particle size is 1 to 5 ~~microns~~ μm .
17. (currently amended) The cell according to claim 16, wherein the average particle size is 1 to 2 ~~microns~~ μm .
18. (original) The cell according to claim 1, wherein the n-type metal oxide has a resistivity less than 100 ohm-cm.
19. (original) The cell according to claim 18, wherein the resistivity is 10 ohm-cm or less.
20. (original) An alkaline electrochemical battery cell according to claim 1, comprising a zinc-containing anode, a manganese dioxide-containing cathode, a separator between the anode and cathode, and an aqueous alkaline electrolyte, wherein at least one of the anode, cathode and electrolyte contains a niobium-doped TiO_2 additive having a resistivity less than 100 ohm-cm.

Applicant : Zihong Jin et al.

Serial No. : 09/787,858

Filed : March 22, 2001

For : Performance Enhancing Additives for Electrochemical Cells

Art Unit:

1745

Examiner:

Tracy Mae Dove

21. (original) The cell according to claim 20, wherein the electrolyte comprises 35 to 37 weight percent potassium hydroxide.

22. (original) The cell according to claim 20, wherein the weight ratio of niobium-doped TiO_2 to MnO_2 is 0.018 to 1 or less.

23. (original) The cell according to claim 22, wherein the weight ratio of niobium-doped TiO_2 to MnO_2 is 0.009 to 1 or less.
